The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

[1] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation comprising:

- a first dielectric substrate having an input transmission line and an output transmission line deposited on a front surface of said first dielectric substrate, said input transmission line being separate by a gap from said output transmission line along direction of propagation of said microwave and millimeter wave signals;

- a cantilever connected to said input transmission line and with projection overlaps at least a part of said output transmission line;

- a first actuation electrode in a form of resistive layer for actuating said cantilever and for DC to RF isolation, with at least a portion being deposited within said gap between said input transmission line and said output transmission line, forming an overlapped portion with said cantilever, said first actuation electrode being connected to a first actuation electrode line having a length and a width;

- a second actuation electrode in a form of resistive layer for actuating said cantilever and for DC to RF isolation, with one end connected electrically to said input transmission line, said second actuation electrode being connected to a second actuation electrode line having a length and a width; and

- a conducting film on said first dielectric substrate forming a ground plane for the

propagating microwave and millimeter wave signals.

[2] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 1, wherein thickness of said first actuation electrode is smaller than thickness of said input transmission line and said output transmission line to minimize interference on the movement of said cantilever.

[3] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 1 further comprising a dielectric layer deposed on said first actuation electrode at least in said overlapped portion to prevent DC shorting between said cantilever and said first actuation electrode when actuated.

[4] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 1 wherein sheet resistance of said first actuation electrode line and said second actuation electrode line is selected to be greater than the characteristic impedance of said input transmission line and said output transmission line, in order to minimize interference on the propagating microwave or millimeter wave signals.

[5] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 1 wherein said cantilever is selected from a group of a single metallic layer and a multiple layer structure with at least one metallic layer for the propagating microwave or millimeter wave signals.

[6] An electrostatically actuated MEMS switch for microwave and millimeter wave

signals with DC to RF isolation as defined in Claim 1, further comprising a recess region in said cantilever and said recess region being located within overlapping region between projection of said cantilever and said output transmission line to enhance electrical contact between said cantilever and said output transmission line.

[7] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device comprising:

- a first dielectric substrate having an input transmission line and an output transmission line deposited on a front surface of said first dielectric substrate, said input transmission line being separate by a gap from said output transmission line along direction of propagation of said microwave and millimeter wave signals;

- a cantilever connected to said input transmission line and with projection overlaps at least a part of said output transmission line;

- a first actuation electrode in a form of resistive layer for actuating said cantilever and for DC to RF isolation, with at least a portion being deposited within said gap between said input transmission line and said output transmission line, forming an overlapped portion with said cantilever, said first actuation electrode being connected to a first actuation electrode line having a length and a width;

- a second actuation electrode in a form of resistive layer for actuating said cantilever and for DC to RF isolation, with one end connected electrically to said input transmission line, said second actuation electrode being connected to a second actuation electrode line having a length and a width;

- a conducting film on said first dielectric substrate forming a ground plane for the propagating microwave and millimeter wave signals; and

- a second dielectric substrate with a third actuation electrode in a form of resistive layer for de-actuating said cantilever and for DC to RF isolation, having a length and a width and with at least a portion being deposited in region overlapping said cantilever, forming an overlapped portion between said third actuation electrode and said cantilever, said third actuation electrode being connected to a third actuation electrode line having a length and a width.

[8] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, wherein thickness of said first actuation electrode is smaller than thickness of said input transmission line and said output transmission line to minimize interference on the movement of said cantilever.

[9] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, further comprising at least one dielectric stopper deposited on said second dielectric substrate next to said third actuation electrode, wherein thickness of said dielectric stopper is larger than thickness of said third actuation electrode to minimize interference on the movement of said cantilever.

[10] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, further

comprising a first dielectric layer deposited on said first actuation electrode and a second dielectric layer on said third actuation electrode to prevent DC shorting between said cantilever and said first actuation electrode when actuated, and between said cantilever and said third actuation electrode when de-actuated.

[11] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, wherein sheet resistance of said first actuation electrode line, said second actuation electrode line and said third actuation electrode line is selected to be greater than the characteristic impedance of said input transmission line and said output transmission line, in order to minimize interference on the propagating microwave or millimeter wave signals.

[12] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, wherein said cantilever is selected from a group of a single metallic layer, a multiple layer structure with at least one metallic layer for the propagating microwave or millimeter wave signals.

[13] An electrostatically actuated MEMS switch for microwave and millimeter wave signals with DC to RF isolation and a de-actuation device as defined in Claim 7, further comprising a recess region in said cantilever and said recess region being located within overlapping region between projection of said cantilever and said output transmission line to enhance electrical contact between said cantilever and said output transmission line.

[14] An electrostatically actuated single-pole-double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation comprising:

- a first dielectric substrate having at an input transmission line, a first output transmission line and a second output transmission line deposited on a front surface of said dielectric substrate for propagating and routing of said microwave and millimeter signals;

- a first cantilever connected to said first output transmission line and with a first projection overlapping at least a part of said input transmission line;

- a second cantilever connected to said second output transmission line and with a second projection overlapping at least a part of said input transmission line;

- a first actuation electrode in a form of resistive layer for actuating said first cantilever and for DC to RF isolation, with at least a portion being deposited within said gap between said input transmission line and said first output transmission line, forming an overlapped portion with said first cantilever, said first actuation electrode being connected to a first actuation electrode line having a length and a width;

- a second actuation electrode in a form of resistive layer for actuating said first cantilever and for DC to RF isolation, with one end connected electrically to said first output transmission line, said second actuation electrode being connected to a second actuation electrode line having a length and a width;

- a third actuation electrode in a form of resistive layer for actuating said second

cantilever and for DC to RF isolation, with at least a portion being deposited within said gap between said input transmission line and said second output transmission line, forming an overlapped portion with said second cantilever, said third actuation electrode being connected to a third actuation electrode line having a length and a width;

- a fourth actuation electrode in a form of resistive layer for actuating said second cantilever and for DC to RF isolation, with one end connected electrically to said second output transmission line, said fourth actuation electrode being connected to a fourth actuation electrode line having a length and a width ; and

- a conducting film on said first dielectric substrate forming a ground plane for propagating of said microwave signals.

[15] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14, wherein thickness of said first actuation electrode and said third actuation electrode is smaller than thickness of said input transmission line, said first output transmission line and said second output transmission line to minimize interference on the movement of said first cantilever and said second cantilever.

[16] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14 further comprising a dielectric layer deposed on said first actuation electrode and said third actuation electrodes at least in said overlapped portions to prevent DC shorting between

said first cantilever and first actuation electrode and between said second cantilever and said third actuation electrode when actuated.

[17] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14 wherein sheet resistance of said first actuation electrode line, said second actuation electrode line, said third actuation electrode line and said fourth actuation electrode line is selected to be greater than the characteristic impedance of said input transmission line and said first and second output transmission lines, in order to minimize interference on the propagating microwave or millimeter wave signals.

[18] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14 wherein said first and second cantilevers are selected from a group of a single metallic layer and a multiple layer structure with at least one metallic layer for the propagation of microwave or millimeter wave signals.

[19] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14, further comprising a recess region in said first and second cantilevers and said recess region being located within overlapping region between projection of said first cantilever and said input transmission line and between projection of said second cantilever and said input transmission line to enhance electrical contact between said first cantilever and said input transmission line and between said second cantilever and said input transmission line.

[20] An electrostatically actuated double-throw MEMS switch for microwave and millimeter wave signals with DC to RF isolation as defined in Claim 14, further comprising a second dielectric substrate with a fifth actuation electrode and a sixth actuation electrode in a form of resistive layer for de-actuating said first cantilever and said second cantilever and for DC to RF isolation, having a length and a width and with at least a portion being deposited in region overlapping said first cantilever and said second cantilever, forming an overlapped portion between said fifth actuation electrode and said first cantilever, between said sixth actuation electrode and said second cantilever, said fifth actuation electrode and said sixth actuation electrode being connected to a fifth and a sixth actuation electrode line having a length and a width.